WARNING

Because of possible shock or fire hazards, connection of this instrument should be performed in compliance with the National Electrical Code (ANSI C1) and/or any other requirements which may be applicable to the user.

Installation, operation, and maintenance should be performed only by qualified personnel.

TM-111026

VOLUME 1

OPERATOR'S MANUAL

626-PA-6014

8-CHANNEL TEMPERATURE MONITOR

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626-PA-6014 8-CHANNEL TEMPERATURE MONITOR

1 INTRODUCTION

This manual provides operating instructions for the 626-PA-6014 8-Channel Temperature Monitor Plug-in, hereinafter referred to as the 6014. The 6014 is designed for installation in the Model 626 Universal Disturbance Analyzer. It is assumed that the reader is familiar with the mainframe information described in TM-106650.

2 PURPOSE

The 6014 is an 8-input module which monitors temperature from -50 to 150 degrees C. With thresholds programmed by the user, the 6014 stores, analyzes, classifies and prints out quantitative and qualitative disturbance data. Accompanying the data is a printout of time derived from a highly accurate crystal-controlled 24-hour clock in the mainframe.

The 6014 monitors changes in any of these parameters, based on user programmable sensitivities, and high and low limits. Each input takes four readings over a 2.5 second period and then averages the readings to determine if a threshold or limit crossing has occurred. The sensitivity value of each type of disturbance, above which detection and printout occurs, is operator programmable. Except for an automatic summary printout at the end of each day, disturbance data is normally printed out only when disturbances occur. In an alternate mode, a disturbance summmary printout occurs only at the end of each day. This feature permits long term unattended operation.

The threshold program may be easily altered, using the front panel switches. Cueing indicators adjacent to the programming switches simplify the programming procedure. A back-up program for the plug-in, stored in hard memory at the factory, may always be recalled upon operator demand. Both the program and the disturbance data in the data accumulators may be printed out upon demand.

3 EQUIPMENT CHARACTERISTICS

The 6014 is configured as a plug-in module 6.5" high by 1.25" wide by 10" deep. It is designed for installation in any one of the five slots of the Model 626 Universal Disturbance Analyzer. Technical specifications of the 6014 are listed in Table 1.

Table 1. 626-PA-6014 Specifications

Input Specification	
Temperature Range:	-50 to +150 deg C
Accuracy	+/- 2 deg C from 0 to 100 deg C +/- 3 deg C otherwise
Cable Length:	100 ft. max (30.5 m)
Cable Temperature:	200 deg C max
Programmable Parameters	
Temperature	
Low Limit:	0 deg C min (-50 deg C via Preset)
High Limit:	154 deg C max
Sensitivity:	1 deg C min
Preset to:	LO=20, HI=30, SENS=2

INSTALLATION

CAUTION

Be sure unit is turned off.

To install the 6014 in the mainframe, proceed as follows:

a. Position the top and bottom rear corners of the plug-in module in the upper and lower tracks at the desired slot position at the rear of the mainframe.

b. Carefully slide the module into the mainframe until it is firmly seated.

c. Tighten the top and bottom captive screws to secure the module to the mainframe.

5 CONNECTING THE SENSOR PROBES TO THE MODULE

CAUTION: To avoid damaging the equipment, do NOT connect or disconnect the probes while the unit is turned on.

The 6014 is supplied with eight connectors on the rear panel. Proceed as follows:

a. Insert key in FUNCTION key switch on the front panel of the mainframe and set switch to OFF position.

b. Connect the eight plugs to the rear panel connectors.

6 OPERATING THE 6014

6.1 Operating Controls and Indicators

The functions of the mainframe operating controls and indicators associated with the 6014 are described in Table 2. Figure 1 shows the typical front panel controls on a Model 626. For a description of controls common to overall Model 626 operation, refer to TM-105550.

Table 2. 6014 Operating Controls

Item	Function
INPUT pushbutton	Used to initiate channel input programming.
LO LIMIT pushbutton	When depressed, enables the numeric keyboard to program low limit for any temperature input.
SENS pushbutton	When depressed, enables numeric keyboard to program sensitivity for any input.
NUMERIC pushbuttons	When single lamp lights, user is cued to press a "1" to "8" for temperature inputs A to H, respectively. Also used to enter numerical values for other functions.
ENTER pushbutton	When depressed, transfers numeric keyboard values into 6014 memory for processing.
DATA pushbutton	When depressed, outputs data summary.
PROG pushbutton	When depressed, outputs program summary.
PRESET pushbutton	With FUNCTION switch set to PROGRAM and a channel switch (1-5) depressed, depressing PRESET switch recalls non-volatile factory program for that input.
HI LIMIT pushbutton	When depressed, enables the numeric keyboard to program high limit for any temperature input.

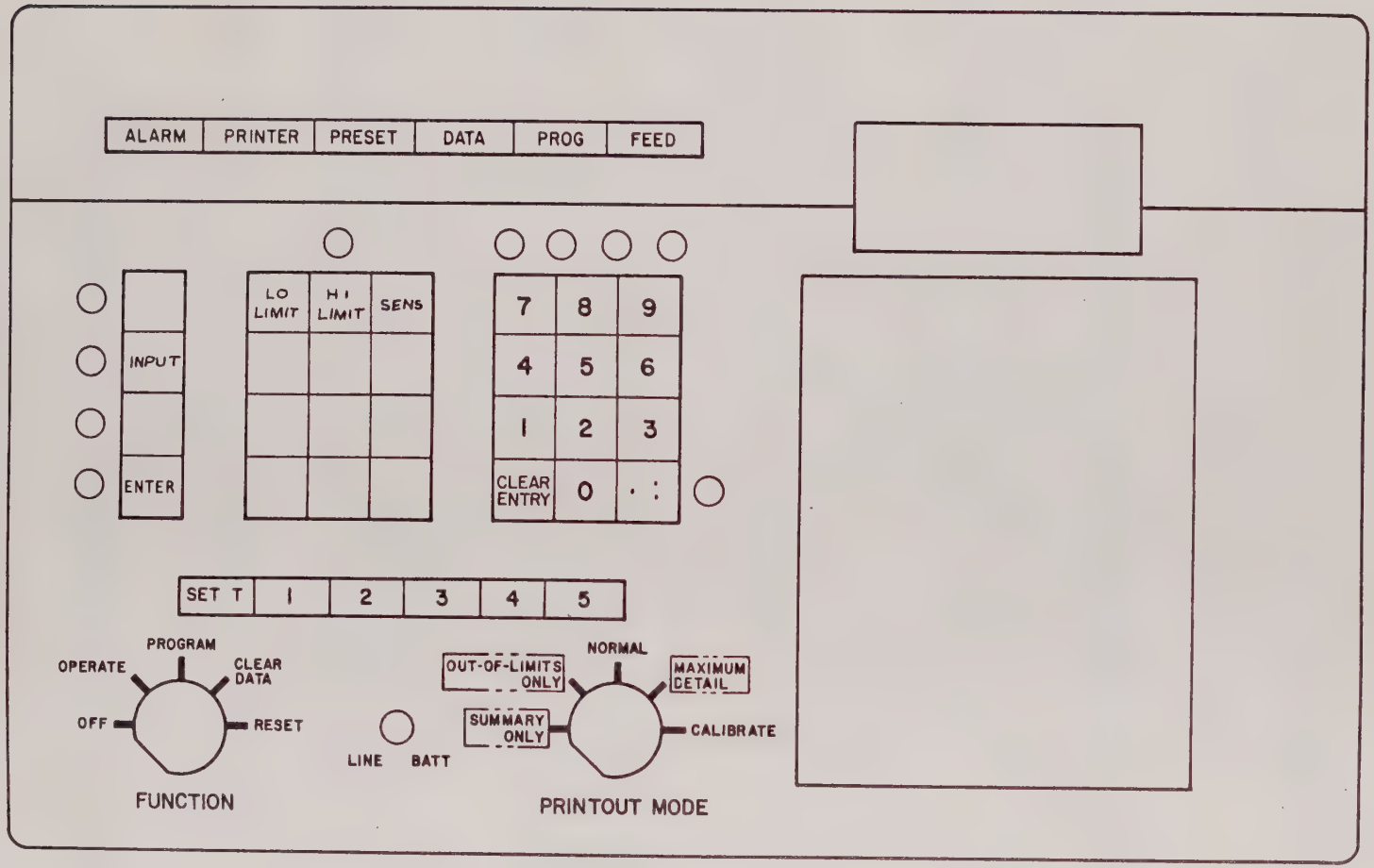

Figure 1. Typical Front Panel with 6014 Installed in Mainframe

6.2 Programming Procedure

Assume it is desired to program Channel B for a temperature high limit of 35 deg C, a low limit of 15 deg C, and a sensitivity of 3 deg C.

For the example cited, program the 6014 as follows:

a. Set FUNCTION switch to PROGRAM.

b. Depress the channel pushbutton (1-5) that corresponds to the slot position of the plug-in to be programmed. Note that a program summary for that channel is immediately printed.

c. Note that the red LED next to the INPUT pushbutton is lit. Pushbutton must then be pressed. Note that the following prompt message is printed and a single yellow LED is lit.

INPUTS A - H
ENTER: 1 - 8 FOR ↑ (read up)

d. Depress a "1" thru "8", depending on which input you wish to change.

Note that the green LED adjacent to the ENTER key is lit, waiting for the ENTER key to be depressed.

(assume a "2" was depressed for the following example)

e. When the ENTER indicator goes out, an indicator above the center bank of pushbuttons lights. This indicates that one of the functions (HI LIMIT, LO LIMIT, SENSITIVITY) may now be programmed. At this time the PRESET button could also be depressed to change all of the parameters for all eight temperature inputs to factory-preset values.

f. Depress the HI LIMIT pushbutton.

g. Note that three yellow LEDS above the numeric keyboard are now lit. Enter 035, using the keyboard. If an error is made, depress CLEAR ENTRY and then the correct entry. Note that the leading zero for numbers less than 100 must be entered.

h. When the value is entered, the lamp next to the ENTER pushbutton lights. Depress this pushbutton to enter the value.

i. Repeat steps c through h for the low limit value (015), using the LO LIMIT pushbutton.

j. Repeat steps c through h for the sensitivity value (03), using the SENS pushbutton. Note that only two yellow LEDS light in step g.

k. The same sequence is used to change any temperature

Input, provided that the appropriate number is entered in step c.

1. The completed program printout should take the following form:

```
HIGH LIMIT Ø7Ø
LOW LIMIT Ø3Ø
SENS Ø1Ø
   INPUT H
HIGH LIMIT Ø55
LOW LIMIT Ø35
SENS Ø15
   INPUT G
HIGH LIMIT Ø35
LOW LIMIT Ø15
SENS ØØ3
   INPUT F
HIGH LIMIT Ø75
LOW LIMIT Ø35
SENS Ø1Ø
   INPUT E
HIGH LIMIT Ø44
LOW LIMIT ØØ5
SENS ØØ3
        *
        *
        *
        *
        *
HIGH LIMIT Ø35
LOW LIMIT Ø15
SENS ØØ3
   INPUT B
HIGH LIMIT 13Ø
LOW LIMIT ØØ5
SENS Ø3Ø
   INPUT A
```

(read up)

625-PA-5014
CH2

PROGRAM SUMMARY

NOTE

The instrument is designed to detect an invalid entry. For example, if the high limit value is selected as 30 deg C, and the user selects a low limit value of 35 deg C, the following printout will appear.

```
HI LIMIT Ø36
LO LIMIT Ø35
```

m. When the plug-in program is completed, the user may proceed to program another module (by depressing another channel number) or he (she) may place the instrument on line by setting the FUNCTION switch to operate. While on line, the program currently in effect may be obtained by simply depressing the PROG pushbutton.

7 DESCRIPTION OF DATA PRINTOUTS

When any of the disturbances described below is detected by the 6014, it is recorded and displayed in characteristic manner.

7.1 Over Limit for Temperature

An over limit condition exists when the monitored average value of temperature exceeds the user-specified upper limit for the respective input. An over limit condition is indicated by a printout such as the following:

```
4B HI 10:47:12.98
      or
4F HI 10:47:09.76
```

where the 4 is the channel number, the B is for temperature input B (or 2), the F is for temperature input F (or 6) and the time is given in hours, minutes and seconds (to Ø.Ø1 sec resolution).

When the temperature recovers to normal, a printout such as the following occurs:

```
4B NOR 10:55:13.77
   Ø73.3 DEG C MAX
      or
4F NOR 11:12:34.21
   Ø65.5 DEG C MAX
```

indicating when the normal temperature was restored and the value of the highest temperature reached during the over limit interval.

7.2 Under Limit for Temperature

An under limit condition exists when the monitored temperature goes below the user-specified lower limit. An under limit condition is indicated by a printout such as the following:

```
4A LO 13:33:23.78
      or
4D LO 12:59:ØØ.Ø1
```

When the temperature returns to normal, a message such as the following is printed:

```
4A NOR 13:44:56.98
   Ø03.1 DEG C MIN
        or
4D NOR 12:59:58.99
   Ø24.2 DEG C MIN
```

indicating when the normal condition was restored and the value of the lowest temperature reached during the under limit interval.

7.3 Temperature Change

A temperature printout is triggered when the temperature changes more than a preselected amount from the last printed value. The change sensitivity is a user programmable value, which is selected independently for each temperature input. The following example shows several temperature input changes.

Printout	Remarks
2C DEC Ø1:22:34.76 Ø13.3 DEG C	Temperature decreased to 13.3 deg C on input C at the time shown
2E INC Ø1:23:55.32 Ø87.3 DEG C	Temperature increased to 87.3 deg C on input E at the time shown

The following example printouts show how various settings of the PRINTOUT MODE switch change the amount of detail in the printed record of a disturbance. It is assumed that the disturbances occurred in Channel 2 and that the limits for Channel 2 were programmed as follows:

```
Input A LOW LIMIT      25 DEG C
Input A HIGH LIMIT     55 DEG C
Input A SENSITIVITY    Ø5 DEG C
```

Disturbances which occur while the PRINTOUT MODE switch is in the SUMMARY ONLY position do not generate individual printouts but they are stored in the daily accumulator and are automatically printed each day at midnight (worst case event and number of occurrences in each category). This printout may also be triggered by depressing the DATA button. The following is an example of a DATA summary:

```
MAX  +Ø85.6 DEG C          max temperature for day
HIGH  ØØØ HT             number of high excursions
MIN  -Ø44.8 DEG C          min temperature for day
LOW  Ø12 HT              number of low excursions
PRES= +Ø19.6 DEG C         present temperature
    INPUT H
MAX  +Ø76.8 DEG C
```

```
    HIGH  001 HT
    MIN  +034.0 DEG C
    LOW  000 HT
    MAX  +134.9 DEG C
    HIGH  003 HT
    MIN  -048.9  DEG C
    LOW  003 HT
    PRES= +045.5 DEG C
         INPUT A

     626-PA-6014
        CH2

TIME = 10:48:15.99
    DAY # 45
  DATA SUMMARY


    2A NOR 12:56.38.51
       078.2 DEG C

    2A HI 12:56:34.52


    2A NOR 03:55:45.98
       013.5 DEG C

    2H INC 03:53:34.89
       024.8 DEG C

    2A INC 03:50:57.67
       019.3 DEG C

    2A DEC 03:40.11.23
       013.5 DEG C

    2A DEC 03:39:45.33
       021.1 DEG C


    2A LO 03:39:45.33
```

↑ (Read up)

↑ (Read up)

Printout of over limit in OUT-OF-LIMITS ONLY mode

Printout of under limit in NORMAL mode.

A B C D E F S H

8 SYSTEM CHECK

When the PRINTOUT mode switch is set to SYSTEM CHECK, the precision reference signals are applied to the measuring circuitry. The probe inputs are disconnected during this time. These signals verify the functionality of the module, but not the actual sensors. The sensors can be checked by the use of a calibrated standard (a precise temperature chamber). The allowable tolerance levels are described below, along with a sample printout:

```
**********************
       V3=000.0          + 0.1
       V2=010.2          +/-0.1
       V1=091.9          +/-0.2

   625-PA-5014
       CH2

TIME = 12:34:56.78
***SYSTEM CHECK***

**********************
```

9 SHORT TERM ACCUMULATOR

If disturbances should take place at a rate faster than the 625 mainframe can process and print them out, and the internal event stack memory should overflow, then subsequent events are stored in summary form in the Short Term Accumulators (until the overflow condition is cleared). These values are cleared out after the printout of the Short Term Accumulators is complete. The format is identical to the Data Summary except the values are printed out only when a HI or LO limit is crossed to expedite the printing.

10 FACTORY REPAIR

When factory repair is desired, proceed as follows:

1. Contact the Dranetz Engineering Customer Service Department and obtain an Authorization Number.

2. Fill out the Repair/Service Order enclosed in this manual and ship it with the equipment to the Customer Service Department.

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